20

Dislocations of Cervical Vertebrae.

BY

James P. Warbasse, M.D.,
BROOKLYN, NEW YORK.

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DISLOCATIONS OF CERVICAL VERTEBRAE.

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Dislocations of vertebrae vary in degree. The most common are the slight subluxations which produce no pressure upon the cord, which give rise to more or less local discomfort, and which are important because the distortion is often great enough to cause pressure upon the spinal nerves passing out between the vertebrae. This pressure or irritation of the nerve trunks, in these more common cases, causes nerve disturbances which are referred remotely from the site of the lesion, namely, at the peripheral distribution of the nerves, and are manifested as peripheral pain, muscular weakness, or trophic derangements. These slight subluxations have been studied by Dr. Henry P. de Forest, of New York, to whom we are indebted more than to any other man for the descriptions of these conditions. He has shown by careful study of cases, by dissections of the spine, and by the treatment of a large number of persons with these subluxations, that they are quite common, and that they are responsible for many incorrect diagnoses.

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[1] Dr. de Forest has presented the results of his studies before a number of societies, but he has not yet published them.

It is not my intention to deal in this paper with these subluxations.[1]

Beyond these slight subluxations of de Forest's is every degree of dislocation up to the extreme lesions causing pressure or even destruction of the cord. All of these injuries occur most commonly in the cervical segment of the spine, because of the greater mobility of the vertebrae in this region and because of the lesser degree of tendinous strength and the lesser extent of bony apposition. These dislocations occur with or without fracture of the articular processes. Not enough cases have had post-mortem examinations and not enough *x*-ray inspections and plates have been made to determine the relative frequency of fracture, dislocation, and fracture-dislocation. The best statistics available are those of Blassius.[2] But, in these statistics the results of *x*-ray examinations are wanting, and the diagnoses are necessarily speculative in many cases.

Most cervical dislocations are the result of extreme flexion of the head upon the thorax, the sternum often being broken by striking against the lower jaw. There must necessarily be rupture or separation of the intervertebral disk; and the ligaments are torn or separated, depending upon the character of the dislocation. In the anterior dislocations one or both articular processes may ride over the corresponding processes of the vertebra below and rest in the intervertebral notch. If this occurs on one side only, the body of the dislocated vertebra is advanced forward about one-fourth of its antero-posterior diameter. If both processes ride forward into the notches, the body is dislocated forward a distance equal to about one-half of its antero-posterior diameter. In the unilateral dislocation the cord is not compressed; in the bilateral dislocation there is pressure upon the cord.

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[2] Blasius: "Die traumatische Wirlelverrenhungen," *Vierteljahr scrfift vür prak. Heilkunde*, 1869, Vol. CII, CIII.

Besides these most frequent forward dislocations, there are also unilateral and bilateral backward dislocations, and unilateral dislocations in opposite directions or by torsion. The dislocation is usually complicated by other injuries. If fracture is not present, there is rupture of ligaments. Hemorrhage from torn intervertebral veins or other vessels always takes place. Hemorrhage into the cord is not an uncommon complication. Paralysis due to hemorrhage must be differentiated from that due to bone pressure. More or less injury to the nerve trunks is present. Diagnosis can be made positively only by the help of the *x*-ray. Reduction should be attempted by traction upon the head. If the nature of the lesion is. In my own experiences, may be employed to cause the dislocated articular process to ride back into place.

The prognosis in dislocations between the atlas and axis is bad. Dislocations of the lower cervical vertebrae are more common, and the prognosis is less grave. The mortality is less in the unilateral than in the bilateral form.

We have encountered cases in which the lesion present seemed to be dislocation, but we can never know unless the vertebrae are exposed by operation or autopsy, or are shown by the *x*-ray, just what the nature of the lesion is. In my own experiences, the autopsy has shown dislocation when fracture was diagnosed and fracture when dislocation was diagnosed, and in a certain number of cases the nature of the bony lesion was not judged. Generally speaking, the dislocations are produced by muscular action or by extreme torsion, flexion or extension of the head. The fractures are produced usually by impactions of the trunk upon the cervical vertebrae and the skull. Figure I shows a bilateral forward dislocation of the sixth cervical vertebra.

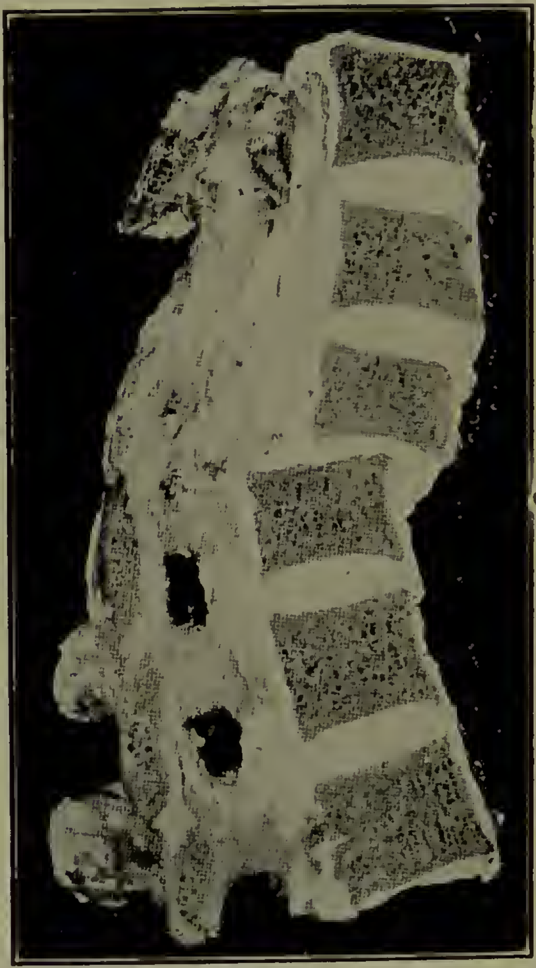

Fig. 1. Bilateral Forward Dislocation of Sixth Cervical Vertebra. From Specimen in Guys Hospital Museum. International Text-Book of Surgery.

The following case is of importance because the diagnosis was made by the *x*-ray, the dislocation still exists, and the patient is doing heavy work and enjoying good health.

L. U., German Hospital, 12,545. Male, age 30. The patient was brought into my service with the history of having fallen backwards into an areaway, while sitting upon a railing, a distance of about six feet, and striking upon the back of his head, the trunk being flexed upon the head. Upon admission there was pain and rigidity of the neck and tenderness over the whole cervical region. No displacement could be discovered by palpation either posteriorly or through the mouth. There was partial anesthesia of both hands, partial paralysis of all of the fingers and paralysis of the bladder. The reflexes were increased in both upper and lower extremities, particularly on the left side. A more careful examination of the nerve conditions by Dr. W. Browning showed the above conditions, and all the reflexes of the arm and forearm exaggerated. Sensation absent on back of hand. Knee-jerk active, ankle clonus active. All large muscles of the extremities tender. Babinski reflex present on both sides. It seemed to Dr. Browning that besides an injury to the cervical vertebrae there was also a fusiform hemorrhage in the gray matter of the cord extending well down into the cervical enlargement.

An *x*-ray picture showed anterior dislocation of the fifth cervical vertebra upon the sixth, the body being dislocated a distance equal to about one-fourth of its antero-posterior diameter. (Figure 2). This condition could not be discovered by palpation. Strong longitudinal extension was made, but the dislocation was not perceptably influenced. While extension was continued, a plaster splint was applied, encasing the head, neck and upper thorax and making pressure upon the chin and occiput and shoulders. There was a gradual improvement in the paralytic symptoms. Catheterization was not required after the seventeenth day. Sensation and motion in the hands returned. The plaster splint was removed at the end of five weeks and the patient allowed up and about on the sixth week.

X-ray plates made seven weeks after the injury showed the dislocation present. The patient left the hospital and went to work. At the end of four months there was practically no limitation in the motions of the neck. The head seemed pitched forward slightly more than normal. There was some tingling in the fingers of the right hand which was muscularly strong. The grip of the left hand was not so strong; and there was inability to extend completely the two last fingers. There was some feeling of stiffness of the quadriceps extensors. There was also a girdle sensation about the waist, present in the evening and absent in the morning.

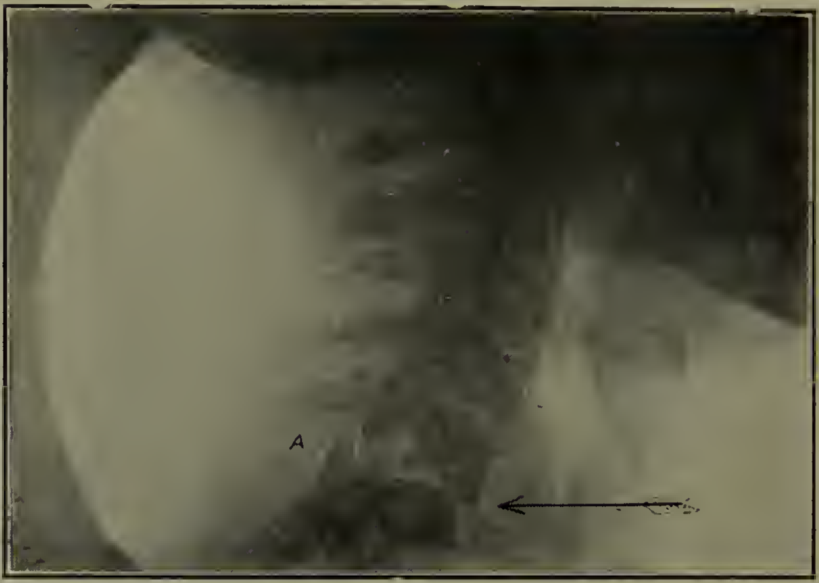

Fig. 2. Unilateral Forward Dislocation of Fifth Cervical Vertebra. Observe left articular process dislocated forward into intervertebral notch. The superior articular process of the sixth vertebra is seen *posterior* to the articular process of the fifth at A. The arrow indicates the dislocation of the body.

One year after the injury, January 27, 1909, examination shows the following conditions: The patient is strong and feels well, and does heavy work. The head and neck are freely movable. No pain. The two last fingers of the left hand cannot be extended completely nor tightly flexed. They are the seat of prickling sensations. Otherwise the hands are normal. The sphincter of the bladder is not strong. If the bladder is not emptied immediately, when there is a desire to urinate, dribbling takes place. The girdle sensation has disappeared, but in its place is the sensation of a lump or a drawing together sensation in the unbilical region. The patient feels well and looks well. There is some pain in the region of the sixth cervical vertebra when the weather changes and becomes cold and damp. The patient, who was previously sexually vigorous, has been sexually impotent since the acci-

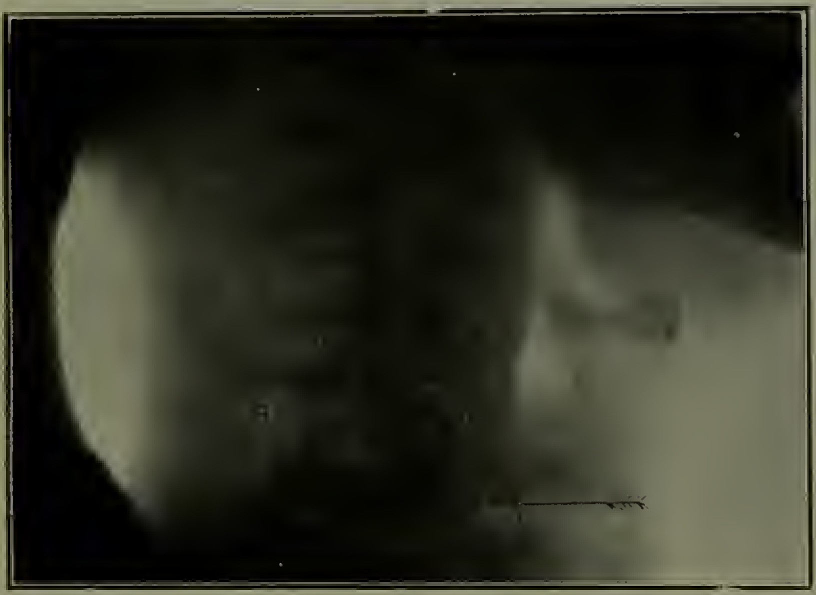

Fig. 3. Unilateral Forward Dislocation of Fifth Cervical Vertebra One Year After Injury. The superior articular process of the sixth vertebra of the right side is seen *anterior* to the articular process of the fifth in normal relation at B. The arrow indicates the dislocation of the body.

dent. An x-ray plate, made by Dr. Charles Eastmond, shows the dislocation practically unchanged. (Figure 3).

I have been much interested in studying the x-ray plates of this case, and comparing them with disarticulated cervical vertebrae. As a result of these comparisons, it is evident that the dislocation is unilateral, for in the bilateral dislocation the body must be moved forward a distance equal to about one-half of its antero-posterior diameter, as is shown in Figure 1. This is absolutely pathognomonic, if the lesion is a dislocation and not a fracture. If the dislocation is unilateral, then the degree of displacement is as is shown in Figure 2 and Figure 3. These two figures show the two sides of the neck. Figure 2 shows the dislocated articular process, that of the fifth lying in front of that of the sixth. Figure 3 shows the articular processes lying in normal relation, that of the fifth behind that of the sixth. Figure 2 is taken with the patient's left side nearest the plate; Figure 3, with the right side. An antero-posterior picture shows the spine of the fifth vertebra deviated to the left. Thus it is evident that the left articular process of the fifth vertebra has ridden over in front of the process of the sixth, and rests in the left intervertebral notch.

The only persistent and unchanging symptom has been the inability to completely extend the last two fingers of the left hand. This I believe to be due to injury to the sixth cervical nerve caused by the articular process of the fifth vertebra falling into the intervertebral notch occupied by this nerve. It will be recalled that these two fingers are extended by the extensor communis digitorum and the extensor minimi digiti muscles, which are supplied by the posterior cord of the musculo-spiral nerve.

which is composed of cords from the sixth and seventh cervical.

It has been possible in cases of unilateral dislocation of cervical vertebrae, to unlock the processes by strong lateral flexion towards the opposite side, combined with traction and appropriate pressure. In such a case, associated with hemorrhage into the cord which is already producing symptoms in the lower extremities and visceral paralysis, I should advise against manipulation of the neck further than longitudinal extension, if the symptoms of bony pressure are but slight and involve only the upper extremities. But if there is no evidence of hemorrhage every effort should be made to reduce the dislocation.

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CONTENTS

ORIGINAL ARTICLES.

Conservatism in Post-Operative Treatment. By S. C. Beede, David City, Neb. 129

The Increasing Tendency to Hurry Patients Out of Bed—Rivalry Among Surgeons—Harm Done by too Short a Period of Bed Treatment—Late Wound Infections—Other Sequels—Illustrative Case—The Importance of Rest in the Process of Repair.

Plaster of Paris and How to Use It. (Continued.) By Martin W. Ware, New York 131

Molded Splint for Forearm Fractures—Gooch Splint—Plaster of Paris in Orthopedics—The Plaster Corset—Vertical Method—Jury-Mast — Horizontal Method — Goldthwait's Method — Hammock Method — Bradford Frame — Plaster Collar — Coronet — Lorenz Bed.

Some Observations on Nephropexy. By D. W. Basham, Wichita, Kansas ..135

Faulty Positions Often Secured by Nephropexy as Usually Done—Complicating Conditions Vitiating Success—Importance of Determining These in Advance—Glenard's Disease—Important Anatomical Considerations—Differential Diagnosis—Methods of Fixation—Author's Technic.

Remarks on Renal Traumatism. By Charles Greene Cumston, Boston ...138

Statistics—Causation—Predisposing Causes—Varieties—Early Symptoms—Local Signs—Retroperitoneal Hemorrhage—Diagnosis—Expectant vs. Operative Treatment—Case Reports.

Hypertrophy of the Pharyngeal and Faucial Tonsils. By Frank C. Raynor, New York. 142

Adenoids — Symptomatology — Etiology — Diagnosis — Medicinal Treatment — Development of the Operative Treatment—Choice of Position—After-Care.
Faucial Tonsils—Their Rôle in Pulmonary Tuberculosis—The Submerged Tonsil—"Tonsillotomy" Unsatisfactory—Complete Enucleation Advised—Technic.

Another Case of Gangrene of the Entire Colon. By Emery Lanphear, St. Louis 145

History of Case—Operative Findings.

A Close-Fitting Hip Splint, Intended Especially for Fracture. By J. P. Hetherington, Logansport, Ind. 146

Purpose of the Splint—Perineal Protection—"Hip Housing"—Photographic Illustrations.

Report of a Case of Hip Disease Simulating Malignant Disease. By John Ridlon, Chicago 147

History—Physical Signs those of Sarcoma—Subsequent Development—Operation.

LETTER TO THE EDITOR.

Concerning Intestinal Anastomosis with the Cautery. From Dudley Tait, San Francisco 147

EDITORIALS.

Recent Developments in the Treatment of Purulent Otitis 148

Application of Bier's Hyperemia—Analysis of Keppler's Experiences with It—Objections to the Method—Fridenberg's Method—What Aspiration after Paracentesis Accomplishes.

The Stereoscope, the Vitascope and the Phonograph in Medical Teaching .149

The Development of Realistic Pictorial Demonstration — Stereoscopic Photographs and their Value—Stereoscopic Atlas of Anatomy—The Vitascope in Reproducing Surgical Operations and Motorial Manifestations—The Vitascope and Phonograph to Reproduce Surgical Clinics.

SURGICAL SUGGESTIONS........150

BOOK REVIEWS.

Treatise on Surgery—Fowler. The Operating Room and the Patient—R. S. Fowler 151

The Edinburgh Stereoscopic Atlas of Anatomy—Cunningham and Waterston. Text-Book of Diseases of the Ear, Nose and Pharynx—Roosa and Douglass. Treatise on Diseases of the Nose and Throat — Shurly. Case Teaching in Medicine—Cabot 152

Principles and Practice of Medicine—Osler. Manual of Diseases of Infants and Children — Ruhräh. Reference Handbook of the Diseases of Children—Fruhwald. Physical Examination of Infants and Young Children—Kilmer. Essentials of Genito-Urinary and Venereal Diseases—Wilcox 153

Text-Book on the Practice of Gynecology—Ashton. Text-Book of Materia Medica, Therapeutics and Pharmacology—Butler. Nursing in the Acute Infectious Fevers—Paul 154

PROGRESS IN SURGERY, A RÉSUMÉ OF RECENT LITERATURE.

Significance of Anesthesia in the Treatment of Inflammations—Massage of the Heart in Chloroform Collapse 164

Plastic Operation to Restore Cutaneous Nasal Septum—Lateral Anastomosis by New Method—Gold Wire in Herniotomy—Perforated Ulcer of the Duodenum 165

Spinal Anesthesia with Stovain and Novocain—Some Uses of Iodin in Surgical Practice—Scopolamin-Morphin Anesthesia — Phenol-Camphor in Acute and Chronic Suppuration 166

Position of, and Mortality from, Ethyl Chlorid General Anesthesia—Results of Surgical Treatment of Exophthalmic Goiter—Treatment of Buboes by the Bier Method—Appendicitis, Ideas Based on 1,000 Cases—Appendicectomy — Post-Operative Femoral Phlebitis 167

Acute Intestinal Obstruction—Cancer of the Rectum—Intrahepatic Biliary Calculi—High Mortality of Appendicitis in Pregnancy—Inguinal Hernia of the Uterus 168

Absence of the Uterus with Bilateral Ovarian Hernia and Vicarious Hemorrhages—Rectal Stenosis Due to Uterine Myoma—Bilateral Torsion of the Fallopian Tubes—Menstruation During Lactation—Flat Foot Series of Disabilities—Mechanical Treatment of Anterior Metatarsalgia—Disability Following Potts' Fracture—Radical Cure of Femoral Hernia 169

Catheterization and Inflation in Acute Otitis Media — Violet Infusions in Malignant Growths—A Protozoa-Like Organism in Malignant Tumors; Tumors Produced with It in Animals — Post-Traumatic Hemorrhage from the Superior Longitudinal Sinus without Fracture—Lange's Infiltration Treatment of Sciatica 169

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